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them all as distinct species, contrary to the recently expressed opinion of Mr. Dresser (*Ibis*, 1892, pp. 374-380).—J. A. A.

**Food Habits of Birds.**—The Annual Report of the Chief of the Division of Ornithology and Mammalogy of the U. S. Department of Agriculture for the year 1892<sup>1</sup> contains, besides Dr. Merriam's account of the work of the Division for the year, a paper by Mr. Walter B. Barrows on 'Economic Ornithology' (pp. 193-200), which includes, besides a general statement of the progress of the work, a report on the 'Food of the Horned Larks (*Otocoris*)' by Mr. Barrows, and a report on the 'Food Habits of the Cedarbird (*Ampelis cedrorum*)' by Mr. F. E. L. Beal. Mr. Barrows concludes that Horned Larks are essentially granivorous, but subsist more or less on insects at all times, and that the nestlings are mainly fed with insects. There is of course no evidence of discrimination on the part of the birds between injurious and beneficial insects, but the whole amount of insect food—"9½ per cent. for the whole year"—is too small to be of economic importance. While they occasionally pick up some newly sown grain or grass seed, the loss on this account must be trifling, their food consisting mainly of the seeds of useless or noxious weeds, and they are thus clearly entitled to protection.

Mr. Beal's conclusions in respect to the Cedarbird are that 17 per cent. of its food consists of insects and that the largest proportion of insect food is taken during the season when fruit is most abundant, and that the young while in the nest are fed to a very great extent upon insect food. Among the insects eaten were several noxious species, as the elm leaf beetle and various caterpillars.—J. A. A.

**Hasbrouck on 'Evolution and Dichromatism in the Genus *Megascops*.'**—In a recent paper<sup>2</sup> in the 'American Naturalist' Mr Hasbrouck has attempted a solution of the problem of dichromatism in the Screech Owls of eastern North America. The paper is evidently the result of much patient labor and presents some new information respecting the distribution of the red and gray phases of this well-known bird, his facts being presented both in tabular form and graphically by means of maps. While the paper, on casual inspection, might be regarded as an interesting and in some ways a valuable contribution to the subject under consideration, a closer examination shows it to be nearly worthless, even as regards the data on which it is ostensibly based. Hence of course we can hardly share the author's confidence that we are here presented with a satisfactory solution of the problem of dichromatism as presented in our *Megascops asio*.

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<sup>1</sup> Report of the Ornithologist and Mammalogist for 1892. By C. Hart Merriam, Rep. Sec'y of Agriculture for 1892 (1893), pp. 181-200.

<sup>2</sup> Evolution and Dichromatism in the Genus *Megascops*. By E. M. Hasbrouck. Am. Nat., 1893, pp. 521-533, 638-649, with 5 maps.

Mr. Hasbrouck divides his paper into two parts: I. 'Relationship of Dichromatism to Evolution'; II. 'Causes and Influences.' In Part I, after giving a history of the views formerly held by ornithologists as to whether the red and gray phases were distinct species or merely two forms of the same species, the author takes up the subject of the geographical distribution of these two color phases, and the "relation of dichromatism to evolution" in the Screech Owl group. In regard to the distribution and evolution of the two phases and of the intermediate stages, he finds that "dichromatism is principally confined to the typical form of *Megascops asio*, appearing but slightly in the Florida form (*Megascops a. floridanus*), and barely reaching the Texan subspecies, *mccallii*," the western and southwestern forms of the group "remaining true to their normal color." He attempts to show, "first, that while the red, the gray and the intermediate phases are at present but individual variations of the same species—the gray was the ancestral stock; second, that from the gray bird has evolved the red, which at some future time will be recognized as a subspecies with a range peculiar to itself, and thus dichromatism is one step in the evolution of the Screech Owl, while the various phases exhibited are the transitory stages of development of one species into another; third, that this condition of affairs is influenced by four powerful factors," two of which are temperature and humidity, "the most potent of which is temperature; fourth, that the *predominating* distribution is largely confined to the faunal divisions of the eastern United States, and as such is approaching the subspecific differentiation of the two phases; lastly, that the Darwinian theory of 'Reproduction with variation and the survival of the fittest,' is well exemplified in our common little *Megascops asio*."

In support of these various propositions he presents data to show that the gray phase is the only form along the northern border of the range of the species, and that its distribution about coincides with the boundaries of the Canadian Fauna, except that it turns abruptly southward in Minnesota and extends down to Middle Kansas. Below this is a somewhat similar belt where mixed birds occur with the gray phase predominant; while below this red birds prevail nearly to the Gulf Coast, where gray birds again begin to predominate and finally gray *only* occur over most of Florida. Red birds alone appear to be found about Washington, and over quite a belt along the Mississippi River, from about the mouth of the Missouri to the mouth of the Arkansas. An examination of his table of localities on which his generalizations, as graphically represented on his Map II, are based, however, shows that the observations are far too scanty to render it at all certain that these sweeping conclusions are well grounded. For instance, only one to three localities are mentioned respectively for such large areas as Alabama, Arkansas, Connecticut, Georgia, Maine, Michigan, Minnesota, Mississippi, Nebraska, New Hampshire, New Brunswick, South Carolina, and Tennessee. The whole number of localities is only 120, and in several instances quite a number of them are included within comparatively small areas. This shows how slender is the basis for a

map, covering the whole United States and southern Canada east of the 100th meridian, with sharply defined areas of distribution for "Gray birds *exclusively*," "Gray birds predominate," "Red birds predominate," and "Red birds *exclusively*." These apparently hard-and-fast areas, as seen on the map, are thus to a very high degree obviously hypothetical and untrustworthy, and are alone sufficient to show the unscientific character of the author's methods.

Not only are the facts given exceedingly insufficient, but to some extent needlessly so, since he appears to have made very little use of the literature available on the subject. But what is worse, both his text and his Map II grossly misrepresent the facts in the case, as already on record before his paper was prepared. For instance, Mr. Ridgway has stated (*Birds of Ill.*, p. 417) that in the vicinity of Washington the two phases both occur, "although the rufous style is perhaps the more common," being in "about the same proportion" as obtains "in the neighborhood of Cincinnati," where out of 56 specimens reported on by Dr. Langdon, "32 were rufous and 24 were gray." Yet only red Owls are given in Mr. Hasbrouck's table of localities as occurring about Washington. Also no red birds are reported from Florida, and the map shows that the region of "Gray birds exclusively" includes all of Florida except its extreme north-eastern portion. We have, however, seen a number of red birds from the Indian River region and southward, and Mr. W. E. D. Scott informs us that in various parts of south Florida visited by him the two phases were in nearly equal proportions, and that near Fort Thompson he found the red prevailing almost to the exclusion of the gray. Mr. C. J. Maynard, after a long experience in southern Florida, says (*Birds of East. N. Am.*, p. 271) "both plumages are found equally common, both North and South," and that he has "found all the stages [red, gray and intermediates] as common there [Florida] as in Massachusetts." Furthermore, the type specimen of the Florida Screech Owl (subsp. *floridanus*) was a *red* bird from the Indian River! (Cf. Ridgway, *Bull. Essex Inst.*, V, p. 200, and *N. Am. Bds.*, III, p. 52.) It may also be added that Mr. Wayne, in the present number of 'The Auk' (p. 337) in a paper on the 'Birds of the Suwanee River,' says of the Florida Screech Owl: "Resident. All I examined were in the red phase."

Whatever basis Mr. Hasbrouck may have had for giving only gray birds from northern New England, northern New York, and the eastern Provinces of Canada, only *three* localities are cited by him for the whole area of Nova Scotia, New Brunswick and Maine combined, and the two from New Hampshire are both near the southern border of the State. Feeling sure of the frequent occurrence of the red phase of the Screech Owl in northern New England, we addressed a letter of inquiry on the subject to Mr. A. H. Verrill of New Haven, Conn., son of Prof. A. E. Verrill, the eminent zoölogist, formerly of Oxford County, Maine, and have received the following: "In reply to your question as to whether my father ever found the red phase of the Screech Owl in Maine, he says that he has

taken it there, but it is much rarer than the gray. I have taken both phases in New Hampshire and Vermont, but found the *red* the commoner in the White Mountains, and the *gray* the commoner in Vermont. In the vicinity of New Haven the gray phase outnumbers the red by about two to one, that is, so far as my experience goes, and I have about 50 specimens brought to me each year to be stuffed." Further comment on this part of the subject is unnecessary. The foregoing sufficiently shows the untrustworthy character of the author's generalizations respecting areas of "exclusively *gray*" birds.

His methods are further illustrated in his tables showing the color of the young in relation to the color of their parents. From these tables he says, "It will be readily seen that red birds breed either all red, all gray, or both; that reds and grays breed either all red, all gray, or both; while gray birds, as previously stated, *invariably breed true*," or always produce gray birds. This last statement is not improbable, perhaps, but 'highly important if true.' So we naturally enquire as to the evidence, and find it based on apparently *six observations*. Turning to the next table, of 'Young produced by Red Parents,' out of 19 cases we find red birds produced "all gray" young in two instances, "all red" in eight cases, and mixed progeny in nine cases. In the third table of 'Young of Gray and Red Parents,' in 12 cases three gave all gray young, four all red, and five mixed broods. On this evidence the author claims that "the grays breed true even in a region where red is the predominating color, *and where the individuals in question may themselves be the offspring of red parents*," and that "gray birds *never* produce red." On this basis it is claimed that the gray birds are "the ancestral stock, and that the producing of gray birds by red parents is a tendency to revert to ancestral characters"; that the red bird is being gradually evolved as a subspecies from the gray bird, and will in time have a distinct and exclusive habitat of its own. While these facts may point to his conclusions, they seem hardly to satisfactorily establish the assumption that "gray birds *never* produce red."

The "four distinct causes" operating to produce all this are: (1) Humidity; (2) Temperature; (3) Acquired characters; (4) Forest areas. Curiously enough, he seeks to correlate the distribution of gray birds with regions of greatest humidity, forgetting apparently that over all the more arid parts of the continent all the birds of the *Megascops asio* group are gray! Again, curiously, he considers the red phase the light-colored type and the gray phase the dark-colored form. Yet with all this he has to confess that the distribution of the several color phases, even as he gives it, fails to conform to the distribution of humidity, or even to the pine forest areas, with which he thinks the habitat of the gray phase ought to agree.

In treating of the influence of temperature he singularly misquotes Verrill and Allen as stating that temperature is the "most potent of all influences in the distribution of color," a statement they not only never made, but in all probability never dreamed of making. If Mr. Hasbrouck will make the slight change of substituting the word *species* for the word

color he will correctly state what they did say. Yet his whole argument on the temperature question hinges on this misstatement.

Under 'Influence of acquired Characters,' his 'Table showing relation of color and sex' has obviously no relevancy, at least in the generalized form in which it is presented. Under 'Influence of Forest Areas' an attempt is made to show "why the gray form is not fitted for those regions in which the red is now so greatly in the majority," but the most we get is a statement that there is a partial coincidence between the distribution of the color phases of the Screech Owl with that respectively of the deciduous and coniferous forests. The main point brought forward is that "coniferous forests in the eastern part of the United States have a grayish cast," and that "where the general aspect of the forest growth is gray, gray birds are found." But that there is not a very close agreement between the distribution of coniferous forests and gray birds even our author has to lament: yet this it seems is fortunately but a slight misfortune for the theory, for if the agreement is not close it ought to be, and possibly in time will be. In fact, so crude and unphilosophical are the author's processes that it is almost difficult to treat his struggle with the Screech Owl question seriously. If he had limited his paper mainly to the presentation of his facts on the distribution of the color phases, which are valuable so far as they go, and had been content to plot them on the map by means of symbols, thus showing just how much they were worth and nothing more, he would have produced a creditable paper and saved lumbering up the literature of ornithology with matter not only practically worthless, but, what is worse, absolutely misleading to those who accept it for what it purports to present; and particularly is this true of his 'Map II.' It is in fact its pernicious and misleading features, masked under headlines and embellished with tables and maps of seemingly scientific character, coupled with the fact of its appearance in a reputable scientific journal, that have called down upon it so extended a notice in the present connection.—J. A. A.

**Cook's 'Birds of Michigan.'**—Professor Cook has done good service to the cause of ornithology through the publication of his 'Birds of Michigan,' prepared and published under the auspices of the Michigan State Board of Agriculture. It is compiled partly from previously published lists, partly from "the valuable manuscripts of the late Dr. H. A. Atkins," and partly from his own observations and those of his students and numerous local observers throughout the State. It appears also that a rough draft of the list was submitted to various prominent ornithologists for revision and comment, with the result of giving by far the most complete and trustworthy list of the birds of Michigan that has thus far appeared.

The list was compiled to meet an urgent need of a carefully prepared catalogue of the birds of the State which should not only give a list of the

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<sup>1</sup> Birds of Michigan. Illustrated. By A. J. Cook. Michigan Agricultural Experiment Station, State Agricultural College, Zoölogical Department, Bulletin 94, April, 1893.—8vo., pp. 148, with numerous cuts in the text.